

Dotnet Package information

1. dotnet_pkg_info Tool

1.1. Introduction

This document describes the `dotnet_pkg_info` tool and how to include the .NET package attributes in the SWAMP assessment framework's `package.conf` file.

Microsoft *.NET core* is a cross-platform framework that can be used to build ASP.NET Core web applications, command-line applications, libraries, and universal windows platform applications. The .NET applications are written in *C#, F#, or Visual Basic* programming languages. The .NET applications typically use `MSBuild` as the build system. The *MSBuild* files, commonly referred to as *project files* adhere to `MSBuild XML schema`. These *project files* end with extensions `.csproj`, `.vbproj` or `.fsproj`. .NET packages that use *Microsoft Visual Studios* for development have one or more `Visual Studios Solution` file (`.sln` extension) in their package directories. A visual studios *solution* files for a package is a text file that has information such as *project* file paths and *build configurations* (`Debug` or `Release`) for the modules in the project.

The `dotnet_pkg_info`, command line tool returns relevant information about a .NET package in a `json` or `text` format. The `dotnet_pkg_info` tool is intended to be used by SWAMP UI team to help users add .NET packages to SWAMP. Code from `dotnet_pkg_info` tool is also be used in the SWAMP backend to get information about the package during the build.

List of functionality of `dotnet_pkg_info`

1. List *Visual Studios Solution Files, Project Files, Target Frameworks* and *Build Configuration* in a package
2. List common .NET *File Type Extensions* and related data
3. List known .NET *Target Frameworks* and related data

1.2. List Visual Studios Solution Files, Project Files, Target Frameworks and Build Configuration in a package.

The main function of `dotnet_pkg_info` is to provide build characteristics of a package in a `json` or `text` format. It does this when it is given arguments that are paths to a `Visual Studios Solution File` (file with `.sln` extension), a .NET `Project File` or a directory (recursively searched for solution or project files).

The .NET ecosystem lets packages to build against different libraries and APIs, some of these may only be available on Windows. In the .NET ecosystem this is referred as *targeting a framework*. When an application targets a particular framework or a set of frameworks, the *project* file for that application must define `TargetFramework` or `TargetFrameworks` attribute whose values are one or more *Target Framework Moniker (TFM)*, see [Appendix A](#) for the current list.

To get SWAMP related information about a package, execute `dotnet_pkg_info` with the path to a package directory or a solution file or a project file as an argument. If the argument is a package directory, `dotnet_pkg_info` recursively searches for *solution* files in the package. For each of the

solution files, it lists the *project files*. And for each of the *project files*, `dotnet_pkg_info` list the provided *target frameworks* and *build configurations*. The options and arguments for `dotnet_pkg_info` are listed in the table [dotnet_pkg_info Options and Arguments](#):

Table 1. `dotnet_pkg_info` Options and Arguments:

Option/Argument	Description
PACKAGE	Path to a directory or a <i>solution</i> file or a <i>project</i> file
--format FORMAT	the values <code>text</code> or <code>json</code> . Default is <code>json</code>
--no-config	Do not display configuration information
--no-framework	Do not display target framework information
--settings PKG_INFO	Validates the package information (PKG_INFO) provided as a <code>json</code> string, combines the PKG_INFO with results from reading PACKAGE information.
--src-file-types	list of .NET source file extensions
--framework-types	list of frameworks available on
--proj-file-types	list of .NET msbuild project file extensions

Example: Package information in JSON format

```
% dotnet_pkg_info ./Identity-2.0.1
```

Output

```
{
  "sln_files": {
    "Identity.sln": [
      "src/AspNetCore.Identity/AspNetCore.Identity.csproj",
      "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj"
    ],
    "IdentityCore.sln": [
      "src/AspNetCore.Identity/AspNetCore.Identity.csproj",
      "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj",
      "src/Extensions.Identity.Stores/Extensions.Identity.Stores.csproj"
    ]
  },
  "proj_files": {
    "src/AspNetCore.Identity/AspNetCore.Identity.csproj": {
      "frameworks": ["netcoreapp2.0", "net461"],
      "configurations": ["Debug", "Release"],
      "default_framework": "netcoreapp2.0",
      "default_configuration": "Debug"
    },
    "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj": {
      "frameworks": ["netstandard2.0"],
      "configurations": ["Debug", "Release"],
      "default_framework": "netstandard2.0",
      "default_configuration": "Debug"
    },
    "src/Extensions.Identity.Stores/Extensions.Identity.Stores.csproj": {
      "frameworks": ["netstandard2.0"],
      "configurations": ["Debug", "Release"],
      "default_framework": "netstandard2.0",
      "default_configuration": "Debug"
    }
  },
  "errors": {
  },
  "warnings": {
  }
}
```

Example: Package information in text format

```
% dotnet_pkg_info --format text ./Identity-2.0.1
```

Output

```
sln_files:
  Identity.sln
    src/AspNetCore.Identity/AspNetCore.Identity.csproj
    src/Extensions.Identity.Core/Extensions.Identity.Core.csproj
  IdentityCore.sln
    src/AspNetCore.Identity/AspNetCore.Identity.csproj
    src/Extensions.Identity.Core/Extensions.Identity.Core.csproj
    src/Extensions.Identity.Stores/Extensions.Identity.Stores.csproj
proj_files:
  src/AspNetCore.Identity/AspNetCore.Identity.csproj
    frameworks:
      netcoreapp2.0
      net461
    configurations:
      Debug
      Release
    default_framework:
      netcoreapp2.0
    default_configuration:
      Debug
  src/Extensions.Identity.Core/Extensions.Identity.Core.csproj
    frameworks:
      netstandard2.0
    configurations:
      Debug
      Release
    default_framework:
      netstandard2.0
    default_configuration:
      Debug
  src/Extensions.Identity.Stores/Extensions.Identity.Stores.csproj
    frameworks:
      netstandard2.0
    configurations:
      Debug
      Release
    default_framework:
      netstandard2.0
    default_configuration:
      Debug
errors:
warnings:
```

NOTE

To get package information without *Build Configuration* and *Target Framework* information, use `--no-config` and `--no-framework` option to the `dotnet_pkg_info` command.

1.2.1. For packages without the solution files

If a package does not have a *solution file* anywhere in the package directory, the tool recursively searches the package for *project files*. It lists the *project files* along with *target frameworks* mentioned in the *project files*. Note that *build configuration* information won't be available in this case as *build configuration* is provided in the *solution files*.

Example: Package information with no solution files

```
% dotnet_pkg_info ./Identity-2.0.1
```

Output

```
{
  "sln_files": {
  },
  "proj_files": {
    "src/AspNetCore.Identity/AspNetCore.Identity.csproj": {
      "frameworks": ["netcoreapp2.0", "net461"],
      "default_framework": "netcoreapp2.0",
    },
    "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj": {
      "frameworks": ["netstandard2.0"],
      "default_framework": "netstandard2.0",
    },
    "src/Extensions.Identity.Stores/Extensions.Identity.Stores.csproj": {
      "frameworks": ["netstandard2.0"],
      "default_framework": "netstandard2.0",
    }
  },
  "errors": {
  },
  "warnings": {
  }
}
```

1.3. Validate and Merge the Package information

If there is existing .NET build data (see section [List Visual Studios Solution Files, Project Files, Target Frameworks and Build Configuration in a package](#)), then that same data can be passed as an option to both verify if the data is still valid and to populate the resulting data with these values. This can be used to populate the selection in the UI displayed to the users to set current values.

Given package information in **json** format, the **--settings** option with the **dotnet_pkg_info** tool verifies that the package information is correct or not for a given package. i.e if the given *solution* and *project* files are present in the package, *target frameworks* and *build configuration* are still valid for the project files. It merges the **json** results with the actually reading the package information

The **--settings** option for the **dotnet_pkg_info** tool takes a **json** string with package information in

the format specified in [section-2](#) of this document and a path to a package directory or a *solution* file or a *project* file as an argument.

The command returns an error if any *solution* or *project* files, or any **framework** or **configuration** attributes in the provided **PKG_INFO_FILE** file are not present in the **PACKAGE**. The format for the error message will as described in the [section-1.7](#)

Example:

```
dotnet_pkg_info ./Identity-2.0.1 --settings '{
  "sln_files": {
    "Identity.sln": [
      "src/AspNetCore.Identity/AspNetCore.Identity.csproj",
      "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj"
    ],
  },
  "proj_files": {
    "src/AspNetCore.Identity/AspNetCore.Identity.csproj": {
      "framework": "netcoreapp2.0",
      "configuration": "Debug",
    },
    "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj": {
      "framework": "netstandard2.0",
      "configuration": "Debug"
    },
  },
}
```

```
{
  "sln_files": {
    "Identity.sln": [
      "src/AspNetCore.Identity/AspNetCore.Identity.csproj",
      "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj"
    ],
    "IdentityCore.sln": [
      "src/AspNetCore.Identity/AspNetCore.Identity.csproj",
      "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj",
      "src/Extensions.Identity.Stores/Extensions.Identity.Stores.csproj"
    ]
  },
  "proj_files": {
    "src/AspNetCore.Identity/AspNetCore.Identity.csproj": {
      "frameworks": ["netcoreapp2.0", "net461"],
      "configurations": ["Debug", "Release"],
      "default_framework": "netcoreapp2.0",
      "default_configuration": "Debug",
      "framework": "netcoreapp2.0",
      "configuration": "Debug",
    },
    "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj": {
      "frameworks": ["netstandard2.0"],
      "configurations": ["Debug", "Release"],
      "default_framework": "netstandard2.0",
      "default_configuration": "Debug",
      "framework": "netstandard2.0",
      "configuration": "Debug"
    },
    "src/Extensions.Identity.Stores/Extensions.Identity.Stores.csproj": {
      "frameworks": ["netstandard2.0"],
      "configurations": ["Debug", "Release"],
      "default_framework": "netstandard2.0",
      "default_configuration": "Debug"
    }
  },
  "errors": {
  },
  "warnings": {
  }
}
```

1.4. Target Frameworks

To display *target frameworks* available on a SWAMP platform, use `--framework-types` option with `dotnet_pkg_info` tool.

Example

```
dotnet_pkg_info --framework-types
```

Output

```
{
  ".NET Standard": {
    "tf_moniker" : [
      "netstandard1.0",
      "netstandard1.1",
      "netstandard1.2",
      "netstandard1.3",
      "netstandard1.4",
      "netstandard1.5",
      "netstandard1.6",
      "netstandard2.0",
      "netcoreapp1.0",
      "netcoreapp1.1",
      "netcoreapp2.0",
      "netcoreapp2.1"
    ],
    "windows_only": false
  },
  ".NET Core" : {
    "tf_moniker" : [
      "netcoreapp1.0",
      "netcoreapp1.1",
      "netcoreapp2.0",
      "netcoreapp2.1"
    ],
    "windows_only": false
  },
  ".NET Framework" : {
    "tf_moniker" : [
      "net11",
      "net20",
      "net35",
      "net40",
      "net403",
      "net45",
      "net451",
      "net452",
      "net46",
      "net461",
      "net462",
      "net47",
      "net471",
      "net472"
    ],
  },
}
```

```

    "windows_only": true
  },
  "Windows Store": {
    "tf_moniker" : [
      "netcore [netcore45]",
      "netcore45 [win] [win8]",
      "netcore451 [win81]"
    ],
    "windows_only": true
  },
  ".NET Micro Framework": {
    "tf_moniker" : [
      "netmf"
    ],
    "windows_only": true
  },
  "Silverlight": {
    "tf_moniker" : [
      "sl4",
      "sl5"
    ],
    "windows_only": true
  },
  "Windows Phone": {
    "tf_moniker" : [
      "wp [wp7]",
      "wp7",
      "wp75",
      "wp8",
      "wp81",
      "wpa81"
    ],
    "windows_only": true
  },
  "Universal Windows Platform": {
    "tf_moniker" : [
      "uap",
      "uap10.0"
    ],
    "windows_only": false
  }
}

```

1.5. Show Source .NET File Extensions

Lists the .NET source file extensions and types.

Example

```
% dotnet_pkg_info --src-file-types
```

Output

```
{
  ".cs": {
    "description": "C# source files",
    "windows_only": false
  },
  ".vb": {
    "description": "Visual Basics source files",
    "windows_only": true
  },
  ".fs": {
    "description": "F# source files",
    "windows_only": true
  }
}
```

1.6. Show .NET Project File Extensions

Lists the .NET project file extensions

```
% dotnet_pkg_info --project-file-types
```

Output

```
{
  ".csproj": {
    "description": "csharp project file"
  },
  ".vbproj": {
    "description": "Visual Basics project files"
  },
  ".fsproj": {
    "description": "fsharp project file"
  }
}
```

1.7. Errors and Warnings

1.8. Error Messages and Exit Status returned by `dotnet_pkg_info`

Incase `dotnet_pkg_info` encounters errors while returning package information or validating a given package information, it returns a `json` data structure that contains one or more errors, each with an *error message*, *error code*, and the *file* that is cause of the error. The *error message* format and *error codes* are given the table [dotnet_pkg_info exit codes](#).

The format for the `json` data structure is as follows:

```
{
  errors: [
    {
      "message": "<message description>",
      "code" : "<error code>"
      "file" : "<path to the file that is the cause of the error>"
    },
    {
      ...
    },
    ...
  ]
}
```

Table 2. `dotnet_pkg_info` exit codes

Error Code	Exit Status	Message Format	Description
SUCCESS	0		Success
INVALID_PACKAGE	1	No solution or project files found in the directory: <directory path> ,	Invalid .NET package, if the package directory does not contain <i>solution</i> or <i>project</i> files
INVALID_SLN_FILE	2	Invalid <i>solution</i> file: <path>	Invalid <i>solution</i> file, not meeting the specification https://docs.microsoft.com/en-us/visualstudio/extensibility/internals/solution-dot-sln-file
PROJECT_FILE_NOT_FOUND	3	project file in the solution file not found:	Project file listed in the solution file not found
INVALID_PROJECT_FILE	4	Invalid project file: <path>	Invalid <project>_ file, not meeting the specification https://docs.microsoft.com/en-us/visualstudio/msbuild/msbuild-project-file-schema-reference

Error Code	Exit Status	Message Format	Description
INVALID_TARGET_FRAMEWORK	5	Invalid target framework: <target framework>	Invalid <i>target framework</i> . If the <i>target framework</i> specified in the package is not in the list
INVALID_BUILD_CONFIGURATION	6	Invalid build configuration: <build configuration>	https://docs.microsoft.com/en-us/dotnet/standard/frameworks
INVALID_FILE_EXTENSION	7	Invalid .NET file extension: <path>	Invalid .NET file extension
FILE_PERMISSION_ERROR	8	File Permission error	If solution, project or directory does not have read permission

1.9. Warnings Messages returned by `dotnet_pkg_info`

If `dotnet_pkg_info` determines if a *project* in a package only can be built on Windows, it returns a warning with the code 'BUILDS_ON_WINDOWS'. For now, there is only one warning reported by the `dotnet_pkg_info` tool.

The format for the `json` data structure is as follows:

```
{
  warnings: [
    {
      "message": "<message description>",
      "code" : "<warning code>"
      "file" : "<path to the file that is the cause of the error>"
    },
    {
      ...
    },
    ...
  ]
}
```

2. Package info to the backend

If a user selects a *solution* file, and a certain set of *project* files and *target* frameworks and *build* configuration for their package. The SWAMP UI or middleware should pass the .NET package information to the backend in a `json` format. The information in the `json` format must be assigned to the `package-dotnet-info` attribute in the `package.conf` file.

The format for the `package-dotnet-info` should be same as the `json` output produced by `dotnet_pkg_info` tool, except for the values for `framework` and `configuration` attributes should be a

single values and not a list, and attributes `default_framework` and `default_configuration` should not be present.

Example:

```
{
  "sln_files": {
    "Identity.sln": [
      "src/AspNetCore.Identity/AspNetCore.Identity.csproj",
      "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj"
    ],
  },
  "proj_files": {
    "src/AspNetCore.Identity/AspNetCore.Identity.csproj": {
      "framework": "netcoreapp2.0",
      "configuration": "Debug",
    },
    "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj": {
      "framework": "netstandard2.0",
      "configuration": "Debug"
    },
  },
}
```

Scenario 1:

User selects a *solution* but does not select projects and does not configure the projects. In this case, `package-dotnet-info` can list the *solution* file with empty list for projects. The *assessment framework* invokes the MSBuild system with the *solution* file as the argument. i.e. all the modules in the *solution* file will be built against frameworks and default configuration provided in the *project* files for the modules.

Example:

```
{
  "sln_files": {
    "Identity.sln": []
  }
}
```

Scenario 2:

User selects a *solution*, and one or more projects in the *solution*, but does not select *configuration* for the projects. In this case, `package-dotnet-info` can list the *solution* file with the list of projects selected by the user. The *assessment framework* invokes the MSBuild system for each of the selected projects. The projects will be built against frameworks and default configuration provided in the selected *project* files.

Example:

```

{
  "sln_files": {
    "Identity.sln": [
      "src/AspNetCore.Identity/AspNetCore.Identity.csproj",
      "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj"
    ]
  },
  "proj_files": {
    "src/AspNetCore.Identity/AspNetCore.Identity.csproj": {
    },
    "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj": {
    },
  }
}

```

Scenario 2:

User selects a *solution*, and one or more projects in the *solution*, and also selects *frameworks* and *configuration* for the projects. The *assessment framework* invokes the MSBuild system for each of the selected projects. The projects will be built against framework and configuration selected by the user.

Example:

```

{
  "sln_files": {
    "Identity.sln": [
      "src/AspNetCore.Identity/AspNetCore.Identity.csproj",
      "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj"
    ]
  },
  "proj_files": {
    "src/AspNetCore.Identity/AspNetCore.Identity.csproj": {
      "framework": "netcoreapp2.0",
      "configuration": "Debug"
    },
    "src/Extensions.Identity.Core/Extensions.Identity.Core.csproj": {
      "framework": "netstandard2.0",
      "configuration": "Debug"
    }
  }
}

```

Appendix A: .Valid Target Framework and Target Framework Moniker

Table 3. Valid Target Framework and Target Framework Moniker

Target Framework	Target Framework Moniker	Windows Only
.NET Standard	netstandard1.0 netstandard1.1 netstandard1.2 netstandard1.3 netstandard1.4 netstandard1.5 netstandard1.6 netstandard2.0	False
.NET Core	netcoreapp1.0 netcoreapp1.1 netcoreapp2.0 netcoreapp2.1	False
.NET Framework	net11 net20 net35 net40 net403 net45 net451 net452 net46 net461 net462 net47 net471 net472	True
Windows Store	netcore [netcore45] netcore45 [win] [win8] netcore451 [win81]	True
.NET Micro Framework	netmf	True
Silverlight	sl4 sl5	True
Windows Phone	wp [wp7] wp7 wp75 wp8 wp81 wpa81	True
Universal Windows Platform	uap [uap10.0] uap10.0 [win10] [netcore50]	False

This list may be change, refer to [<https://docs.com/en-us/dotnet/standard/frameworks>] for the update list.